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# Pesticide Fact Sheet Number 20: Amitrole

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This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

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b. Identifiers/Open-Ended Terms

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Office of Pesticide Programs (TS-768C)
Washington, DC 20460

EPA

# Pesticide Fact Sheet

Name of Chemical: AMITROLE
Reason for Issuance:
Date Issued: May 14, 1984
Fact Sheet Number: 20

1. Description of chemical:

Generic name: Amitrole

Common name: Amitrole

Trade names: Weedazole®, Amino Triazole Weed Killer®, Cytrol®, Amitrol T®, Domatol®, Vorox®, Amizole®, X-All®, Ustinex®, AT, ATA, Aminotriazole 90 and Chempar Amitrole

EPA Shaughnessy code: 004401

Chemical abstracts service (CAS) number: 61-82-5

Year of initial registration: 1948

Pesticide type: Herbicide

U.S. and foreign producers: Not produced in U.S., major importers are Union Carbide, American Cyanamid and Aceto Chemical.

2. Use patterns and formulations:

Application sites: Noncrop sites including rights-of-way, marshes, drainage ditches, ornamentals and around commercial, industrial, agricultural, domestic and recreational premises.

Types of formulations: Technical (90%, 95%); wettable powder (15%, 25%); flowable concentrate (0.33 lb/gal, 0.44 lb/gal, 1%); soluble concentrate/liquid (0.3 lb/gal, 2 lb/gal); soluble concentrate/solid (50%, 90%) and pressurized liquid (0.36%, 1%)

Types and methods of application: Applied as a spray for broadcast, spot or directed treatments using aerial or ground equipment.

Application rates: 0.9 to 20 lbs a.i./A depending upon weed species and method of application

Usual carriers: water

3. Science findings:

Summary science statement:

Extensive data gaps exist for Amitrole in product chemistry, toxicology, ecological effects and environmental fate. Amitrole has demonstrated oncogenic potential and is a candidate for Special Review. Because of this oncogenic risk, all use patterns and application techniques (except for homeowner uses) are classified as restricted.

Chemical characteristics:

Physical state: Crystalline powder

Color: Transparent, colorless

Odor: Odorless

Melting point: 159° C

Solubility: 28g/100g water, soluble in some polar solvents

Stability: Stable in heat to 100° C. Amitrole sublimes under reduced pressure.

pH: Aqueous solutions are neutral.

Unusual handling characteristics: None

Toxicology characteristics:

Acute toxicology results:

Acute oral $LD_{50}$ (rat) > 4.08 gm/kg, Toxicity category III

Acute dermal $LD_{50}$ (rabbit): No mortalities reported, Toxicity category III

Primary eye irritation (rabbit): Amitrole is slightly irritating, additional testing is required.

Chronic toxicology results:

Feeding/Oncogenicity: Amitrole has an anti-thyroid effect in laboratory rats. Dogs fed Amitrole exhibited thyroid and pituitary changes.

Reproduction: Amitrole does not cause reproductive effects.

Teratology: Additional testing required.

Mutagenicity: Amitrole does not cause mutagenic effects.

Metabolism: Amitrole is rapidly eliminated from the body.

Major routes of exposure: Mixers, loaders and applicators would be expected to receive the most exposure via skin contact and inhalation.

Physiological and biochemical behavioral characteristics:

Absorption and translocation: It is readily absorbed and rapidly translocated in the roots and leaves of higher plants.

Mechanism of pesticidal action: Amitrole interferes with the metabolism of nucleic acid precursors, disrupts chloroplast development and regrowth from buds.

Environmental characteristics:

Adsorption and leaching in basic soil types: Amitrole exhibits intermediate soil mobility.

Microbial breakdown: Microbial metabolism is the expected major route of degradation.

Resultant average persistance: Amitrole residues degrade with a half-life of <1 to 56 days in non-sterile aerobic soils. The soil dissipation rate is affected by moisture, temperature, cation exchange capacity and clay content, but is unaffected by soil pH. Amitrole is persistent in pond water and hydrosoil.

Ecological characteristics:

Hazards to fish and wildlife:

Avian dietary $LC_{50}$: Mallard duck > 5,000 ppm
Ring-neck pheasant > 5,000 ppm

Freshwater fish $LC_{50}$: Rainbow trout > 180 mg/l
Bluegill sunfish > 180 mg/l

Aquatic invertebrate $LC_{50}$ > 10 ppm

Tolerance assessments: Temporary Maximum Residue Limits for Amitrole of 0.02 ppm have been established by FAO/WHO for those crops where residues are likely to occur. There are no established tolerances for Amitrole in the U.S., Canada, and Mexico. There are no food or feed uses in the U.S. and residues are not permitted on any food or water intended for irrigation, drinking, or other domestic purposes.

Problems known to have occurred from use: The Pesticide Incident Monitoring System (PIMS) listed eight incidents resulting from the use of Amitrole alone from 1972 to 1977. One incident involved illegal residue on apples and two others involved plant injury resulting from soil residues. The remaining five incidents involved pesticide applicators receiving medical attention after exposure. Symptoms included skin rash, vomiting, diarrhea and nosebleed. There were no reported fatalities. PIMS incidents are voluntarily reported, do not include detailed follow-ups and are not validated in any way.

4. Summary of regulatory position and rationale:

Use classification: Restricted (for all uses except for homeowner uses)

Use, formulation, geographical restrictions: Noncropland areas only

Unique label warning statements:

Manufacturing-Use Products:

Products intended for formulation into end-use products must bear the following statement:

"For formulation only into end-use herbicide products intended for noncropland, outdoor use."

"The use of this product may be hazardous to your health. This product contains amitrole, which has been determined to cause cancer in laboratory animals. Products intended for formulation into restricted-use pesticides must require on their labeling that a respirator be worn during mixing and loading. Lightweight waterproof clothing (jumpsuit [or coverall], boots [or shoes], gloves, and a wide-brimmed plastic hardhat) must be worn when mixing and loading all products and when applying all products to control dense, tall vegetation. Workers applying this product in all other situations must wear lightweight waterproof gloves and boots (or shoes). Products intended for formulation into general-use pesticides must require on their labeling that waterproof gloves be worn while handling the product."

All products must bear the following statements:

"Each formulator is responsible for obtaining EPA registrations for its formulated product(s)."

"Do not discharge into lakes, streams, ponds, or public waters unless in accordance with NPDS permit. For guidance, contact your Regional Office of the EPA."

End-Use Products:

All restricted-use products must bear the following statements:

"Restricted Use Pesticide"

"For retail sale to and application only by certified applicators or personnel under their direct supervision."

"The use of this product may be hazardous to your health. This product contains amitrole, which has been determined to cause cancer in laboratory animals. Wear a respirator during mixing and loading of all products. Wear lightweight waterproof clothing (jumpsuit [or coverall], boots [or shoes], gloves, and a wide-brimmed plastic hardhat) when applying all products to control dense, tall vegetation. Workers applying this product in all other situations must wear lightweight waterproof gloves and boots (or shoes)."

All homeowner products must bear the following statements:

"The use of this product may be hazardous to your health. This product contains amitrole, which has been determined to cause cancer in laboratory animals. Wear waterproof gloves when using this product."

All products intended for nonaquatic uses must bear the following statement on the label:

"Do not apply directly to water or wetlands. Do not contaminate water by cleaning of equipment or disposal of wastes."

All products intended for aquatic uses must bear the following statement on the label:

"Consult your state Fish and Game Agency before applying this product to public waters. Permits may be required before treating such waters."

All products must bear the following statements, regardless of classification:

"Do not allow spray or spray drift to contaminate edible crops or water intended for irrigation, drinking or other domestic purposes."

"Do not allow livestock to graze or feed in treated noncrop areas."

Summary of preliminary risk/benefit review:

Risks:

Amitrole is not used on food crops and there is no dietary exposure to amitrole. Dermal exposure is the major source of exposure, with inhalation furnishing only a minor contribution to the total body burden. Human exposure, in some circumstances, occurs at doses which resulted in antithyroid effects in laboratory animals.

Conservatively assuming 100% dermal penetration, the oncogenic risk associated with some use patterns and application techniques is high. Lightweight waterproof clothing and a respirator are expected to reduce exposure and risk for all uses except the power wagon application.

Benefits:

The largest use site by production volume, the highway rights-of-way site was selected for this limited analysis. Amitrole is not produced in the United States, with under 800 thousand pounds being imported by Union Carbide, American Cyanamid and Aceto Chemical. Amitrole, in combination with other chemicals, offers low cost, broad spectrum control of both newly emerged or established broadleaf weeds as well as seasonal control by residual chemicals with which it is mixed. Alternatives include contact herbicides and mechanical cutting.

5. Summary of major data gaps:

Generic data requirements:

Product chemistry: data due 6 months after receipt of Standard

Statement of composition
Discussion of formation of unintentional ingredients
Preliminary analysis
Density, bulk density, or specific gravity
Solubility
Vapor pressure
Dissociation constant
Octanol/Water partition coefficient
Submittal of samples

Toxicology:

Acute testing: data due 6 months after receipt of Standard

Primary eye irritation
Primary skin irritation
Dermal sensitization

Subchronic testing: data due 24 months after receipt of Standard

90-day dermal
90-day inhalation

Chronic testing: data due 24 months after receipt of Standard

Teratogenicity - 2 species

Special testing: data due 6 months after receipt of Standard

Dermal absorption study

Wildlife and aquatic organisms: data due 24 months after receipt of Standard

Avian oral $LD_{50}$
Freshwater fish $LC_{50}$
Acute $LC_{50}$ freshwater invertebrates
Acute $LC_{50}$ estuarine and marine organisms

Environmental fate:

Data due 6 months after receipt of Standard:

Hydrolysis studies
Photodegradation studies in water
Photodegradation studies on soil
Leaching and adsorption/desorption
Special exposure study - Protective clothing effectiveness

Data due 24 months after receipt of Standard:

Aerobic soil metabolism study
Anaerobic aquatic metabolism study
Aerobic aquatic metabolism study
Soil dissipation study - field
Aquatic (sediment) dissipation study - field
Forestry dissipation study - field
Soil, long-term dissipation study (field) - reserved, depending upon results of field dissipation study
Accumulation studies - irrigated crops

Product specific data requirements for manufacturing-use products containing Amitrole:

- Product chemistry: data due 6 months after receipt of Standard

Statement of composition
Discussion of formation of unintentional ingredients
Preliminary analysis
Certification of limits
Analytical methods for enforcement of limits
Density, bulk density, or specific gravity
pH
Oxidizing or reducing action
Flammability
Explodability
Storage stability

Toxicology:

Acute testing: data due 6 months after receipt of Standard

Primary eye irritation - rabbit
Primary dermal irritation
Dermal sensitization

6. Contact person at EPA:

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